The Rapids

US EPA's Trash Free Waters Monthly Update
October 2021

epa.gov/trash-free-waters

Introduction

Hello all,

Happy Fall! **The Mississippi River Plastic Pollution Initiative 2021 Science Report** was released last month through a partnership between The United Nations Environment Programme (UNEP) North America Office, the Mississippi River Cities and Towns Initiative (MRCTI), the University of Georgia's Debris Tracker, and the National Geographic Society. This study provides a first-ever snapshot of the state of plastic pollution along the Mississippi River thanks to the help of hundreds of citizen scientists.

I also encourage you to read a recent **paper** included in *Global Environmental Change* funded by the Commonwealth Scientific and Industrial Research Organization (CSIRO), Ocean Conservancy, and PADI AWARE Foundation highlighting the ubiquity of plastic pollution hotspots and the links to socioeconomics.

Please continue to share any upcoming events with Layne Marshall (marshall.layne@epa.gov) so that the Trash Free Waters team can advertise these opportunities with all of you on the first Monday of each month.

Thanks,
Romell Nandi
US EPA
Trash Free Waters Program Lead

EPA Announcements

Memorandum of Understanding Between EPA and the Mississippi River Cities and Towns Initiative
EPA recently signed a Memorandum of Understanding (MOU) with the Mississippi River Cities and Towns Initiative (MRCTI) to sustainably manage waste and materials and prevent and reduce plastic pollution in the Mississippi River corridor. The MOU aims to help communities along the river demonstrate the positive impact solid waste and water quality improvements made within the communities can have on the environment and accelerate the reduction of plastic pollution.

TFW Tweets on International Coastal Cleanup Day

EPA posted on social media to encourage citizens to partake in International Coastal Cleanup Day on September 18th. Tweets referenced 2020 cleanup findings and the TFW homepage.

Gulf of Mexico Partnership ETAP List Standard Operating Procedures
A mobile version of EPA's Escaped Trash Assessment Protocol (ETAP) – a litter collection tool – called the "Gulf of Mexico Partnership" is now accessible via the Marine Debris Tracker (MDT) application. A Standard Operating Procedure (SOP) and companion materials were developed to help ETAP users adapt to using an application platform for categorizing and analyzing collected debris.

GLRI TFW Grant Awardees Announced
EPA awarded the city of Erie, Pennsylvania $309,300 and the University of Wisconsin - Oshkosh $417,830 as part of the second Great Lakes Restoration Initiative (GLRI) Trash Free Waters grant opportunity. Recipients plan to use these funds to install trash collection devices and purchase a trash skimmer boat in order to keep litter out of Lake Erie and Lake Michigan.

Deepwater Horizon Marine Debris Project
The Deepwater Horizon (DWH) Regionwide Trustee Implementation Group (EPA, NOAA, DOI, USDA, Gulf of Mexico states) recently finalized its first restoration plan focused on restoring natural resources injured by the DWH oil spill that range across the Gulf of Mexico. The restoration plan includes a project dedicating $7 million to restoring sea turtles and birds through marine debris hotspot identification, marine debris removal and data collection, and debris prevention through public outreach.

Funding Opportunities

Tortoise and Freshwater Turtle Conservation Fund (F21AS00587)
The new USFWS Tortoise and Freshwater Turtle Conservation Fund is soliciting proposals that conserve threatened tortoise and freshwater turtle species that occur in foreign countries and in territories of the United States. USFWS will further prioritize projects that measurably advance one of the program's key goals: 1) Reduce threats to survival, 2) Enhance reproductive success, 3) Build country capacity for establishing/implementing protection policies, and 4) Change attitudes and behavior regarding the use and protection of turtles. **Applications are due October 4.**

Sharing Science Grants for Science Communication and Outreach
This funding opportunity, offered through the American Geophysical Union, will provide grants (averaging $1,000 or less) to scientists around the world to encourage and jump-start outreach and engagement activities that will share science and its value with wider communities, from journalists to policymakers to students to members of the public. A variety of science communication and outreach activities are eligible. **The application period closes October 11**.

Tom Ford Plastic Innovation Prize
Tom Ford and 52HZ are offering $1.2 million to the innovators who create the best replacement for thin-film plastic; one that can be used in everything from polybags (the fashion industry's packaging of choice) to single-use, resealable sandwich and storage bags. This opportunity is a two-year competition, followed by three years of support for competition finalists, designed to incentivize the development and adoption of these alternatives to thin-film plastic. **The submission window closes on October 24.**

EPA Region 4 Sustainable Materials Management Grants (EPA-R4-LCRD-2021-11)

EPA Region 4 is soliciting applications from eligible applicants to improve community resilience and sustainability through sustainable materials management. EPA anticipates awarding approximately $300,000 for 3-7 grants, ranging from approximately $40,000 to $100,000. Applicants' projects must take place within EPA Region 4, which includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Regional projects should address municipal recycling markets or strategies for preventing food loss and waste in Region 4. **The application deadline is October 25.**

NOAA FY2022 Marine Debris Prevention Grants

NOAA will fund prevention projects that actively engage and educate a target audience (such as students, teachers, industries, etc.) in hands-on programs designed to raise awareness, reduce barriers to marine debris prevention, and encourage and support changes in behaviors to ensure long-term prevention of marine debris. NOAA will also fund projects in the U.S.-Mexico and U.S.-Canada border regions, subject to additional eligibility criteria. The NOAA Marine Debris Program will host an applicant webinar later this year, providing an overview of the process and materials required for submitting a full application. This funding opportunity requires a Letter of Intent to be submitted via email to grants.marinedebris@noaa.gov **no later than October 29**.

Other opportunities...

Youth Innovation Challenge

The Youth Innovation Challenge, hosted by The Global Environmental Education Partnership (GEEP), invites applicants from 15 to 30 years of age to propose a solution to address climate change and/or marine litter, using environmental education as a key strategy. They are looking for solutions that are innovative, feasible, and informed by research. Your solution could win you a $1,000 prize! **The deadline to submit proposals is October 25.**

Take Care of Texas Video Contest

The Take Care of Texas Video Contest is a fun way for young people to learn about protecting the environment and come up with creative ways to share this knowledge with others. Students film a 30-second video that shows positive ways to Take Care of Texas. The students that submit the best videos can win great prizes, awarded by the contest sponsor, Waste Management of Texas, Inc. Students residing in Texas and enrolled in the 6th through 12th grade can participate. **Entries must be uploaded on or before 5PM on December 3.**

BoatUS Foundation Grassroots Grants Program

The BoatUS Foundation is looking for creative and innovative projects that promote safe and clean boating on local waterways. Nonprofit organizations, boating clubs, student groups, chapters of national organizations, and other groups are eligible. Past topics have included hands-on education about the effects of marine debris. Applications are **reviewed on a rolling basis**, and up to $10,000 is available.

Upcoming Events

International Solid Waste Association World Congress

October 4-7th

The ISWA World Congress is the flagship event of the International Solid Waste Association where practitioners, policymakers, researchers, and academics from across the world gather to network,

collaborate, learn, and inspire. The overall theme of the event is "From waste management to a circular economy – the road ahead."

Sustainability Week: Countdown to COP26
October 4-7th
Sustainability Week will feature presentations from experts, global corporations, policymakers, and investors who are committed to reversing climate change through innovative thinking. Several panel sessions, including "Transitioning from an Extractive to a Circular, Regenerative Worldwide Economy" and "How Should Packaging Be Reimagined to Be Made More Sustainable," relate to trash-free waters.

Sustainable Packaging Coalition ADVANCE 2021
October 5-6th
SPC Advance 2021 will be held virtually by the Sustainable Packaging Coalition. The conference will be divided into 3 tracks: Regenerative and Renewable, Innovation and Trends, and Extended Producer Responsibility (EPR) and Policy. The event will feature a range of topical experts with discussions surrounding circularity, EPR, plastic alternatives, chemical upcycling of waste plastics, and more.

Recycling Revisited – Other Recyclables and Emerging Markets
October 6th (11AM ET)
This webinar is offered as part of the Southeast Recycling Development Council's (SERDC) "Recycling Revisited" webinar series. The event will focus on recyclables other than plastics, glass, paper, and metal, and will include a discussion on emerging markets.

Showcasing Best Practices in Solid Waste Management
October 6th (3-4:30PM ET)
This webinar will be hosted by the United Nations Environment Programme, Caribbean Environment Porgramme, and Caribbean Tourism Organization. Panelists will showcase work being done by different stakeholders in the Caribbean and their initiatives to reduce pollution from solid waste and plastics.

Blockchain for Circular Economy Actors in 10 Questions
October 11th (8:30AM ET)
The National Institute of Circular Economy (INEC), expert member of the Strategic Committee on Blockchain for the Circular Economy of the French Federation of Blockchain Professionals, will use this webinar to provide insight on how and why blockchain is increasingly used in the circular economy.

NAAEE 2021- The Power of Connection
October 12-15th
The North American Association for Environmental Education's 50th Annual Conference will feature six concurrent virtual tracks: 1) Advancing Civic Engagement and Sustainable Communities, 2) Building Leadership for Environmental Literacy, 3) Connecting with Nature, 4) Conservation and Environmental Education, 5) Green Schools, Universities, and Vocational Institutions and 6) Linking Research and Practice to Increase Impact.

Thought Leadership Panel: Promoting a Circular Economy
October 13th (10:30AM – 12:00PM ET)
Join the Mid-Atlantic and New England (MANE) region of the US Green Building Council for a virtual, interactive session on how promoting a circular economy within our region will promote a better standard of living for all. Panelists include: Jane Abernethy, Chief Sustainability Officer of Humanscale, Ron Gonen, Founder and CEO of Closed Loop Partners, Celeste McMickle, Director of Client Solutions,

TRUE Zero Waste certification, US Green Building Council (Moderator), and Peter Templeton, President and CEO of Cradle to Cradle Products Innovation Institute.

Future of Plastics Forum

October 13-14th

This virtual conference will assess how business can tackle plastics pollution and find solutions that drive sustainable plastics use. The Innovation Forum will bring together key industry players from across the value chain to discuss current expectations and drivers as well as practical and realistic solutions that are innovative and scalable. This event will bring together 200+ key actors from across the globe, including speakers from organizations such as Unilever, Coca-Cola Europacific Partners, The Body Shop, and The Consumer Goods Forum.

Deconstruction and Reuse Conference 2021

October 19-21st

This virtual conference is the only North American conference focused explicitly on reuse in the built environment and will look at how we can make reuse a priority as we rebuild better. A variety of topics will be discussed, including material reuse in relationship to equity, inclusion, and environmental health and justice, policy as drivers of reuse and circular economy, innovation in tech and reuse, and a discussion of successes and future goals.

Corporate Plastic Pollution Scorecard Webinar

October 20th (1-2:15PM ET)

As You Sow's new Corporate Plastic Pollution Scorecard 2021 report was released on September 30th. It ranks 50 companies in the fast food, consumer products, and retail sectors on key aspects of packaging sustainability (e.g. design, reuse, transparency, recyclability/recycling) with tangible metrics and deep dives assessing leaders and laggards, and cutting-edge actions. Expert guest panelists will cover the state of corporate action on the plastic pollution crisis, a review of scorecard findings, and a discussion around corporate responsibility for plastic packaging waste.

The Journey to Zero Waste

October 21st (1PM ET)

In this session, speaker Celeste McMickle, Director of Client Solutions at TRUE Zero Waste, US Green Building Council will discuss the role of the zero-waste hierarchy and other waste reduction strategies in the journey to zero waste. The speaker will discuss the TRUE certification framework, which is the US Green Building Council and Green Business Certification Inc. (GBCI) zero waste certification program. The session will also include a business case study example.

Maine and Oregon: The New Frontiers of Packaging EPR

October 27th (12:30-2PM ET)

With Maine and Oregon passing the nation's first extended producer responsibility (EPR) laws for packaging this year, there is much interest in what the EPR programs will look like once they launch and how each state arrived at its unique program model. Join the Product Stewardship Institute's expert members from the Maine Department of Environmental Protection and the Oregon Department of Environmental Quality to learn about these groundbreaking new laws straight from the source.

Salvaging Solutions – Abandoned and Derelict Vessels Policies and InfoHub Reflections

October 27th (3PM ET)

Attend the eighth webinar in the NOAA Marine Debris Program's series, *Salvaging Solutions to Abandoned and Derelict Vessels (ADV) Webinar*, to discuss ADV Policies and InfoHub Reflections. Katie

Register, Executive Director of Clean Virginia Waterways of Longwood University and Jefferson Flood, Coastal Planner of the Office of Virginia Coastal Zone Management Program will be presenting.

Conservation Marketing Conference
October 28-30th
The ConsMark 2021 conference theme is "Changing Behavior in a Changing Climate." This virtual event will feature presentations on a wide range of environmental topics from traditional ecological knowledge to marine pollution and plastics.

Save the dates for future months...

Coastal and Estuarine Research Federation Biennial Conference
November 1-4th and 8-11th
CERF 2021, hosted by the Coastal and Estuarine Research Federation, will virtually bring together hundreds of scientists and researchers in discussions surrounding the collective goals of preserving coastal and estuarine habitats, resources, and heritage.

National Recycling Congress
November 3-4th
The National Recycling Congress is a two-day educational and networking event organized by the National Recycling Coalition. This event will bring together local, state and national experts to discuss best practices and the latest developments on national legislation; climate change; market development; circularity; waste prevention, reuse, recycling, and composting; and justice, equity, diversity and inclusion.

New York State Association for Reduction, Reuse, and Recycling (NYSAR^3) Annual Recycling Conference
November 9-10th
The 32nd Annual NYSAR^3 Conference will be a hybrid event, offering both virtual and in-person attendance options. NYSAR3 will provide attendees with an in-depth look on targeted discussions involving recycling, composting, market development, and much more at the New York/Northeast level.

Extended Producer Responsibility (EPR) Coffee Hour
December 3rd (2PM ET)
Join Beyond Plastics, Conservation Law Foundation, National Stewardship Action Council, UPSTREAM, and Break Free From Plastic US for a free informal "coffee hour" conversation to talk about the latest EPR proposals and what to look for to make sure the goals are achieved.

National Zero Waste Virtual Conference
December 8-9th
The National Zero Waste Conference is the annual two-day virtual educational and networking event organized by Zero Waste USA in partnership with the National Recycling Coalition. Zero Waste Business will be the focus on Wednesday, December 8 and Zero Waste Communities on Thursday, December 9. The conference will feature local, national and international experts discussing Zero Waste and high diversion best practices and latest developments.

Pinniped Entanglement Prevention and Response Workshop- Sharing Best Practices to Improve Safety and Success

December 12th (8:30AM-5:30PM ET)
This in-person workshop will be held in advance of The Society for Marine Mammalogy 24th Biennial Conference on the Biology of Marine Mammals in Palm Beach, FL. The event is intended to bring together pinniped researchers, managers, and practitioners interested in reducing global pinniped entanglements and interactions with active fishing gear. Attendance preference will be given to those registered for the conference and non-conference registrants will have to pay a non-registrant participant surcharge.

In case you missed it...

Microplastics Health Effects Workshop Report Out Webinar
The Southern California Coastal Water Research Project (SCCWRP), San Francisco Estuary Institute, and the University of Toronto hosted a webinar on September 8th summarizing findings on how to develop thresholds when biological effects are likely to be triggered as a result of microplastics exposure, and the feasibility of developing these thresholds for both drinking water and for organisms exposed in the ambient environment.

The World Circular Economy Forum (WCEF) 2021
WCEF2021 brought together leaders, policymakers, experts, and enthusiasts from around the world to focus on the key actions and systemic changes needed to create the conditions for long-term success on the path towards a thriving circular economy that contributes to achieving the UN's Sustainable Development Goals.

The Microplastics Breakdown

MICROPLASTIC SOURCES, TRANSPORT AND FATE

Biodegradable microplastics (BMPs): a new cause for concern?
Can Wang, Jiefa Yu, Ying Lu, Di Hua, Xiao Wang and Xuehua Zou
This article focused on biodegradable plastics (BDP), which are materials that can replace conventional plastics for certain uses, and as a result, there has been a concomitant increase in the global production of these materials. However, the authors pointed out that there are some problems and challenges associated with their use. For example, the biodegradability of BDPs needs conditions such as suitable temperature, humidity, and microorganisms must be met, otherwise BDPs and conventional plastics are basically the same in terms of the longevity and will also become plastic garbage and microplastics polluting the water and soil. Under the effects of wave erosion, sunlight, and biodegradation, biodegradable plastic waste will gradually decompose into small pieces and left in the ocean to form biodegradable microplastics (BMPs). The authors postulated that BMPs may have similar properties with conventional microplastics and can be used as vectors of pollutants and microorganisms in the environment. They do not believe that BDPs are more environmentally friendly than conventional plastics without degradation. According to the article, existing studies have shown that the adsorption of BMPs to pollutants is much higher than that of conventional microplastics. Additionally, the authors observed that biofilms can be formed on the surface of BMPs and cited a study which showed that biofilm appeared on the surface of all biodegradable plastic bags after being submerged in the marine environment for 1 month, suggesting that microorganisms may be more likely to aggregate on the surface of BDPs.

Low abundance of microplastics in commercially caught fish across southern Australia

Nina Wootton, Patrick Reis-Santos, Natalie Dowsett, AlisonTurnbull, Bronwyn M.Gillanders
This study examined the abundance of microplastics (MP) in nine commercially available, wild-caught fish species purchased from seafood markets across Australia. MPs were sampled from the fish gastrointestinal (GI) tracts and quantification was undertaken by chemical digestion and then identifying the amount and type of MP under a microscope and Fourier transform infrared spectrometer. All fish species sampled had MPs, but the average plastic ingestion was less than other similar global studies. Differences were observed in the frequencies of occurrence and plastic load between states and species. Fish from different trophic levels (carnivores, detrivores, herbivores, omnivores) and those which reside in different habitat zones (reef, pelagic and demersal) had differing levels of plastic. Fish from South Australia were found to have had the highest percentage of fish with plastic (49%) and Tasmania the lowest (20%). Overall, the study results show that approximately one third of all commercially important fish being sold in Australian fish markets had MPs in their GI tract contents. The authors pointed out that analyzing the GI tract only provides a glimpse of what the individual fish has recently ingested; over their lifetime fish will be consuming MP, with individuals either dying due to suffocation or plastic-induced satiation prior to being caught, but also egesting smaller plastics. They then noted that once ingested, MPs can remain in the digestive tract of fish for anywhere from days to weeks; MPs can then transfer to other aquatic organisms and up the food web, potentially contributing to the finding that higher amounts of microplastic were found in carnivorous fish.

Microplastics and anthropogenic fibre concentrations in lakes reflect surrounding land use
Andrew J. Tanentzap, Samuel Cottingham, Jérémy Fonvielle, Isobel Riley,Lucy M. Walker, Samuel G. Woodman, Danai Kontou, Christian M. Pichler, Erwin Reisner, Laurent Lebreton
The authors sampled MPs and anthropogenic fibres in surface waters of 67 European lakes between April and September 2019; the study did not differentiate MPs based on composition. These lakes were located mainly in Northern and Western European countries, with only 5 lakes in former Eastern Bloc countries. The authors then compared their study results to microparticle concentrations in a database that they created of existing data collected from horizontal trawls of lakes, rivers, and marine/estuarine environments. The authors observed that the microparticle concentrations they found were higher than previously reported in lakes and comparable to rivers and oceans. This study also explored the surrounding land use, water chemistry, and plastic emissions to sites estimated by considering local hydrology, population density, and waste production. Increased levels of MP concentrations were found to be associated with increased estimated mismanaged waste inputs and wastewater treatment loads. Furthermore, the study results indicated that human activities were the strongest predictors of surface water microparticle concentrations in the European lakes from the field survey. More microparticles were found in catchments with lower forest cover; concentrations doubled, on average with decreasing surrounding forest cover. The authors asserted that their data would help contextualize future work, and the models that they developed as part of their analyses could inform control and remediation efforts.

POTENTIAL HUMAN HEALTH IMPACTS

Microplastics in the Environment: Intake through the Food Web, Human Exposure and Toxicological Effects
Concetta Pironti, Maria Ricciardi, Oriana Motta, Ylenia Miele, Antonio Proto and Luigi Montano
The authors reviewed the literature related to MPs and concluded that current research is predominantly focused on environmental contamination rather than human health interactions. They described their approach to this review as a three-pillar approach: (1) delineation of the urgency and seriousness of MPs in the food web in terms of human health; (2) impacts of MPs on water, air, and soil properties, including the potential risks when dispersed into other environment media, transferred along the food chain, and accumulated by animals, plants, and humans; (3) determination of contamination and accumulation of

MPs in water, soil, air, and food, particle toxicity, and the proposal of future research directions according to the existing literature. All of the literature they reviewed suggested a not-negligible human exposure to MPs through inhalation, secondly from ingestion, and, to a lesser extent, through dermal contact. Several of the studies reviewed indicated high MP concentrations in the environment, with the resulting transport of these particles within the food web, from seafood to beverages and fruits. The authors observed that a higher number of studies have researched the contamination of sea products, drinking water, salts for human consumption, and honey, sugar, fruit, and chickens. These results, they noted, suggest a not-negligible ingestion of MP particles through food consumption. However, their review indicated that many of the toxic effects of ingested MPs were reported to occur at high MP concentrations as compared to the concentrations to which humans are exposed. Consequently, the authors suggested that further studies be performed to assess the real consequences of MPi contamination at concentrations in the range of human exposure.

Polystyrene microplastics induce hepatotoxicity and disrupt lipid metabolism in the liver organoids
(Pre-Publication)
Wei Cheng, Xiaolan Li, Yue Zhou, Hengyi Yu, Yichun Xie, Huaqi Guo, Hui Wang, Yan Li, Yan Feng, Yan Wang
This study used an *in vitro* 3D model to explore the adverse biological effect of 1 μm polystyrene-MP (PS-MP) microbeads applying a non-static exposure approach. The model consisted of liver organoids (LOs) generated from human pluripotent stem cells. These LOs were exposed to 0.25, 2.5 and 25 μg/mL PS-MP. The authors found that exposure to microplastics causes hepatotoxicity and disrupts lipid metabolism in the human pluripotent stem cells-derived liver organoids, which provides evidence for human implication. Specifically, they observed that PS-MP could increase the expression of the gene HNF4A, which controls the expression of several genes, including the expression of several hepatic genes; and CYP2E1, which works to clear toxins from the body. The authors concluded that their findings indicate that there are potential adverse outcome pathways (AOPs) associated with exposure to PS-MP and the potential risks of PS-MP on liver steatosis, fibrosis and cancer were implicated. The combined application of novel LOs model and AOPs framework provides a new insight into the risk assessment of MPs.

MICROPLASTICS POLICY

Macro problems from microplastics: Toward a sustainable policy framework for managing microplastic waste in Africa
Gideon Gywa Deme, David Ewusi-Mensah, Oluwatosin Atinuke Olagbaju, Emmanuel Sunday Okeke, Charles Obinwanne Okoye, Elijah Chibueze Odii, Onome Ejeromedoghene, Eghosa Igun, Joseph Okoro Onyekwere, Olayinka Kehinde Oderinde, Edmond Sanganyado
The authors examined policies, legislation and regulations enacted to control microplastic pollution in Africa. Their analysis revealed that most countries employed traditional approaches, e.g., plastic bans, production and importation levies, and consumer taxes. The authors observed that there has been a continued increase in MP waste generation, which suggests that traditional approaches might not be effective. What they proposed is a hybrid regulatory approach involving price-based, right-based, legislation and behavioral frameworks. The article recommended the following steps: 1) A quantitative assessment of plastic waste management (e.g., amounts of plastic recycled, landfilled, and reused) to develop a baseline and ability to measure progress over time; 2) Early stakeholder engagement in MP policymaking to help increase commitment to policies; 3) Promotion of sustainability thinking within population; and 4) An integrated approach, dependent on state instruments and made open to investors interested in MP management strategies.

If you'd like to see your posting in this email, please email Marshall.Layne@epa.gov with any suggestions!

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